

What is Claimed is:

1. A gas-powered gun, comprising means for simulating a recoil approximating a recoil generated by a gun firing a powder-propelled projectile.

2. The gas-powered gun according to claim 1, wherein said means for simulating a recoil approximating a recoil generated by a gun firing a powder-propelled projectile comprise:

a bolt reciprocating between a forward position and a rearward position, said bolt being biased towards its forward position, said bolt having a gas-receiving surface; and

a valve assembly dimensioned and configured to discharge compressed gas both forward into a firing chamber and rearward onto said bolt face when said bolt reaches its forward position.

3. The gas-powered gun according to claim 2, wherein said valve assembly comprises:

a stationary forward valve;

a housing reciprocating between a forward position wherein said forward valve is open, and a rearward position wherein said forward valve is closed, said housing being biased towards its rearward position; and

a rear valve reciprocating between a forward position wherein said rear valve is open, and a rearward position wherein said rear valve is closed, said rear valve being biased towards its rearward position.

4. The gas-powered gun according to claim 4, further comprising a spring dimensioned and configured to bias said housing and said rear valve towards their rear positions.

5. The gas-powered gun according to claim 4, wherein said spring, forward valve, and rear valve form a captive assembly.

6. The gas-powered gun according to claim 2, wherein said bolt includes a floating mass.

7. The gas-powered gun according to claim 2, further comprising a buffer assembly dimensioned and configured to bias said bolt towards its forward position, and to provide a recoil for a shooter.

8. The gas-powered gun according to claim 7, wherein said buffer assembly comprises a spring-biased air resistance bolt driver.

9. The gas-powered gun according to claim 8, wherein said air resistance bolt driver comprises two detachable components, dimensioned and configured for use within buffer tubes having at least two different lengths.

10. The gas-powered gun according to claim 7, wherein said buffer assembly comprises a spring-biased floating mass bolt driver.

11. The gas-powered gun according to claim 7, wherein said buffer assembly comprises:

- an air resistance bolt driver;
- a floating mass bolt driver; and
- a spring disposed therebetween.

12. The gas-powered gun according to claim 1, further comprising a trigger assembly including:

a trigger having a finger-engaging portion and a selector-engaging portion;

a selector, comprising:

a first surface dimensioned and configured to abut said selector-engaging portion of said trigger and to resist movement of said trigger;

a second surface dimensioned and configured to abut said selector-engaging portion of said trigger and to permit a first distance of movement of said trigger;

a third surface dimensioned and configured to abut said selector-engaging portion of said trigger and to permit a second distance of movement of said trigger, said second distance of movement being greater than said first distance of movement;

a channel dimensioned and configured to permit a third distance of movement of said trigger, said third distance of movement being greater than said second distance of movement; and

said selector is dimensioned and configured to permit said first surface, second surface, third surface, and channel to be selectively positioned to engage said trigger's selector-engaging portion.

13. The gas-powered gun according to claim 12, wherein said first surface corresponds to safe, said second surface corresponds to semiautomatic operation, said third surface corresponds to full automatic operation at a first cyclic rate, and said channel corresponds to full automatic operation at a second cyclic rate, said second cyclic rate being faster than said first cyclic rate.

14. The gas-powered gun according to claim 12, further comprising a sear trip operatively associated with said trigger.

15. The gas-powered gun according to claim 14, further comprising a sear, said sear having a first end dimensioned and configured to selectively engage and release a bolt, and a second end dimensioned and configured to engage said sear trip, said sear being spring-biased into engagement with said bolt, said sear being secured to a receiver by a sliding pivot.

16. The gas-powered gun according to claim 15, wherein said sear trip further comprises an end having an upper step and a lower step, with said upper step and lower step each having a radiused corner.

17. The gas-powered gun according to claim 1, comprising:

a magazine assembly, comprising:

a magazine having a plurality of chambers, each of said chambers being dimensioned and configured to be axially aligned with a barrel, and to receive a projectile therewithin;

means for automatically indexing said magazine upon the cycling of a bolt; and

means for automatically aligning one of said chambers with said barrel upon completion of indexing.

18. The gas-powered gun according to claim 17, wherein said magazine is a cylinder.

19. The gas-powered gun according to claim 18, further comprising a magazine tube dimensioned and configured to align with one of said magazine's chambers and to contain projectiles, said magazine tube containing a spring-biased follower.

20. The gas-powered gun according to claim 18, wherein said means for automatically indexing said magazine upon the cycling of a bolt comprise:
a pawl carrier reciprocating between a first side position and a second side position; and

a pawl dimensioned and configured to engage one of said chambers when said pawl carrier is in said first side position, and one of said chambers when said pawl carrier is in said second side position, said pawl being biased towards said magazine.

21. The gas-powered gun according to claim 20, wherein said pawl comprises:

a pusher surface dimensioned and configured to index said magazine when said pawl carrier moves from said first side position to said second side position; and

a ramped surface dimensioned and configured to permit said pawl to exit one of said chambers when said pawl carrier moves from said second side position to said first side position, and to engage another of said chambers when said pawl carrier reaches said first side position.

22. The gas-powered gun according to claim 20, further comprising an operating rod secured to a bolt, said bolt reciprocating between a forward position and a rear position, said operating rod being dimensioned and configured to cyclic said pawl carrier upon the cycling of said bolt.

23. The gas-powered gun according to claim 22, wherein said operating rod is dimensioned and configured to move said pawl carrier from said second position to said first position when said bolt moves towards its forward

position, and to move said pawl carrier from said first position to said second position when said bolt moves towards its rear position.

24. The gas-powered gun according to claim 23, wherein:
said operating rod comprises a slot, said slot being angled relative to a direction of travel of said bolt; and
said pawl carrier includes a pin dimensioned and configured to engage said slot in said operating rod.

25. The gas-powered gun according to claim 17, wherein:
said magazine includes an exterior surface having a plurality of flutes, with each of said flutes corresponding to one of said chambers; and
said means for automatically aligning one of said chambers with said barrel upon completion of indexing comprise a spring-biased bearing dimensioned and configured to engage one of said plurality of flutes.

26. The gas-powered gun according to claim 25, wherein said bearing has a radius larger than a radius of said flutes.

27. The gas-powered gun according to claim 17, wherein said magazine is an elongated sliding member, said sliding member having a plurality of indexing chambers.

28. The gas-powered gun according to claim 27, wherein said means for automatically indexing said magazine upon the cycling of a bolt comprise:
a pawl carrier reciprocating between a first side position and a second side position; and

a pawl dimensioned and configured to engage one of said indexing chambers when said pawl carrier is in said first side position, and one of said indexing chambers when said pawl carrier is in said second side position, said pawl being biased towards said magazine.

29. The gas-powered gun according to claim 28, wherein said pawl comprises:

a pusher surface dimensioned and configured to index said magazine when said pawl carrier moves from said first side position to said second side position; and

a ramped surface dimensioned and configured to permit said pawl to exit one of said indexing chambers when said pawl carrier moves from said second side position to said first side position, and to engage another of said indexing chambers when said pawl carrier reaches said first side position.

30. The gas-powered gun according to claim 29, further comprising an operating rod secured to a bolt, said bolt reciprocating between a forward position and a rear position, said operating rod being dimensioned and configured to cyclic said pawl carrier upon the cycling of said bolt.

31. The gas-powered gun according to claim 30, wherein said operating rod is dimensioned and configured to move said pawl carrier from said second position to said first position when said bolt moves towards its forward position, and to move said pawl carrier from said first position to said second position when said bolt moves towards its rear position.

32. The gas-powered gun according to claim 31, wherein:
said operating rod comprises a slot, said slot being angled relative to a direction of travel of said bolt; and
said pawl carrier includes a pin dimensioned and configured to engage said slot in said operating rod.

33. A trigger assembly for a gas powered gun, comprising:
a trigger having a finger-engaging portion and a selector-engaging portion;
a selector, comprising:
a first surface dimensioned and configured to abut said selector-engaging portion of said trigger and to resist movement of said trigger;
a second surface dimensioned and configured to abut said selector-engaging portion of said trigger and to permit a first distance of movement of said trigger;

a third surface dimensioned and configured to abut said selector-engaging portion of said trigger and to permit a second distance of movement of said trigger, said second distance of movement being greater than said first distance of movement;

a channel dimensioned and configured to permit a third distance of movement of said trigger, said third distance of movement being greater than said second distance of movement; and

said selector is dimensioned and configured to permit said first surface, second surface, third surface, and channel to be selectively positioned to engage said trigger's selector-engaging portion.

34. The trigger assembly according to claim 33, wherein said first surface corresponds to safe, said second surface corresponds to semiautomatic operation, said third surface corresponds to full automatic operation at a first cyclic rate, and said channel corresponds to full automatic operation at a second cyclic rate, said second cyclic rate being faster than said first cyclic rate.

35. The trigger assembly according to claim 33, further comprising a sear trip operatively associated with said trigger.

36. The trigger assembly according to claim 35, further comprising a sear, said sear having a first end dimensioned and configured to selectively engage and release a bolt, and a second end dimensioned and configured to engage said sear trip. said sear being spring-biased into engagement with said bolt, said sear being secured to a receiver by a sliding pivot.

37. The trigger assembly according to claim 36, wherein said sear trip further comprises an end having an upper step and a lower step, with said upper step and lower step each having a radius corner.

38. A magazine assembly for a gas-powered gun, comprising:
a magazine having a plurality of chambers, each of said chambers being dimensioned and configured to be axially aligned with a barrel, and to receive a projectile therewithin;

means for automatically indexing said magazine upon the cycling of a bolt; and

means for automatically aligning one of said chambers with said barrel upon completion of indexing.

39. The magazine assembly according to claim 38, wherein said magazine is a cylinder.

40. The magazine assembly according to claim 39, further comprising a magazine tube dimensioned and configured to align with one of said magazine's chambers and to contain projectiles, said magazine tube containing a spring-biased follower.

41. The magazine assembly according to claim 39, wherein said means for automatically indexing said magazine upon the cycling of a bolt comprise:

a pawl carrier reciprocating between a first side position and a second side position; and

a pawl dimensioned and configured to engage one of said chambers when said pawl carrier is in said first side position, and one of said chambers when said pawl carrier is in said second side position, said pawl being biased towards said magazine.

42. The magazine assembly according to claim 41, wherein said pawl comprises:

a pusher surface dimensioned and configured to index said magazine when said pawl carrier moves from said first side position to said second side position; and

a ramped surface dimensioned and configured to permit said pawl to exit one of said chambers when said pawl carrier moves from said second side position to said first side position, and to engage another of said chambers when said pawl carrier reaches said first side position.

43. The magazine assembly according to claim 41, further comprising an operating rod secured to a bolt, said bolt reciprocating between a

forward position and a rear position, said operating rod being dimensioned and configured to cyclic said pawl carrier upon the cycling of said bolt.

44. The magazine assembly according to claim 43, wherein said operating rod is dimensioned and configured to move said pawl carrier from said second position to said first position when said bolt moves towards its forward position, and to move said pawl carrier from said first position to said second position when said bolt moves towards its rear position.

45. The magazine assembly according to claim 44, wherein:
said operating rod comprises a slot, said slot being angled relative to a direction of travel of said bolt; and

said pawl carrier includes a pin dimensioned and configured to engage said slot in said operating rod.

46. The magazine assembly according to claim 38, wherein:
said magazine includes an exterior surface having a plurality of flutes, with each of said flutes corresponding to one of said chambers; and
said means for automatically aligning one of said chambers with said barrel upon completion of indexing comprise a spring-biased bearing dimensioned and configured to engage one of said plurality of flutes.

47. The magazine assembly according to claim 46, wherein said bearing has a radius larger than a radius of said flutes.

48. The magazine assembly according to claim 38, wherein said magazine is an elongated sliding member, said sliding member having a plurality of indexing chambers.

49. The magazine assembly according to claim 48, wherein said means for automatically indexing said magazine upon the cycling of a bolt comprise:
a pawl carrier reciprocating between a first side position and a second side position; and

a pawl dimensioned and configured to engage one of said indexing chambers when said pawl carrier is in said first side position, and one of

said indexing chambers when said pawl carrier is in said second side position, said pawl being biased towards said magazine.

50. The magazine assembly according to claim 49, wherein said pawl comprises:

a pusher surface dimensioned and configured to index said magazine when said pawl carrier moves from said first side position to said second side position; and

a ramped surface dimensioned and configured to permit said pawl to exit one of said indexing chambers when said pawl carrier moves from said second side position to said first side position, and to engage another of said indexing chambers when said pawl carrier reaches said first side position.

51. The magazine assembly according to claim 50, further comprising an operating rod secured to a bolt, said bolt reciprocating between a forward position and a rear position, said operating rod being dimensioned and configured to cyclic said pawl carrier upon the cycling of said bolt.

52. The magazine assembly according to claim 51, wherein said operating rod is dimensioned and configured to move said pawl carrier from said second position to said first position when said bolt moves towards its forward position, and to move said pawl carrier from said first position to said second position when said bolt moves towards its rear position.

53. The magazine assembly according to claim 52, wherein:
said operating rod comprises a slot, said slot being angled relative to a direction of travel of said bolt; and

said pawl carrier includes a pin dimensioned and configured to engage said slot in said operating rod.